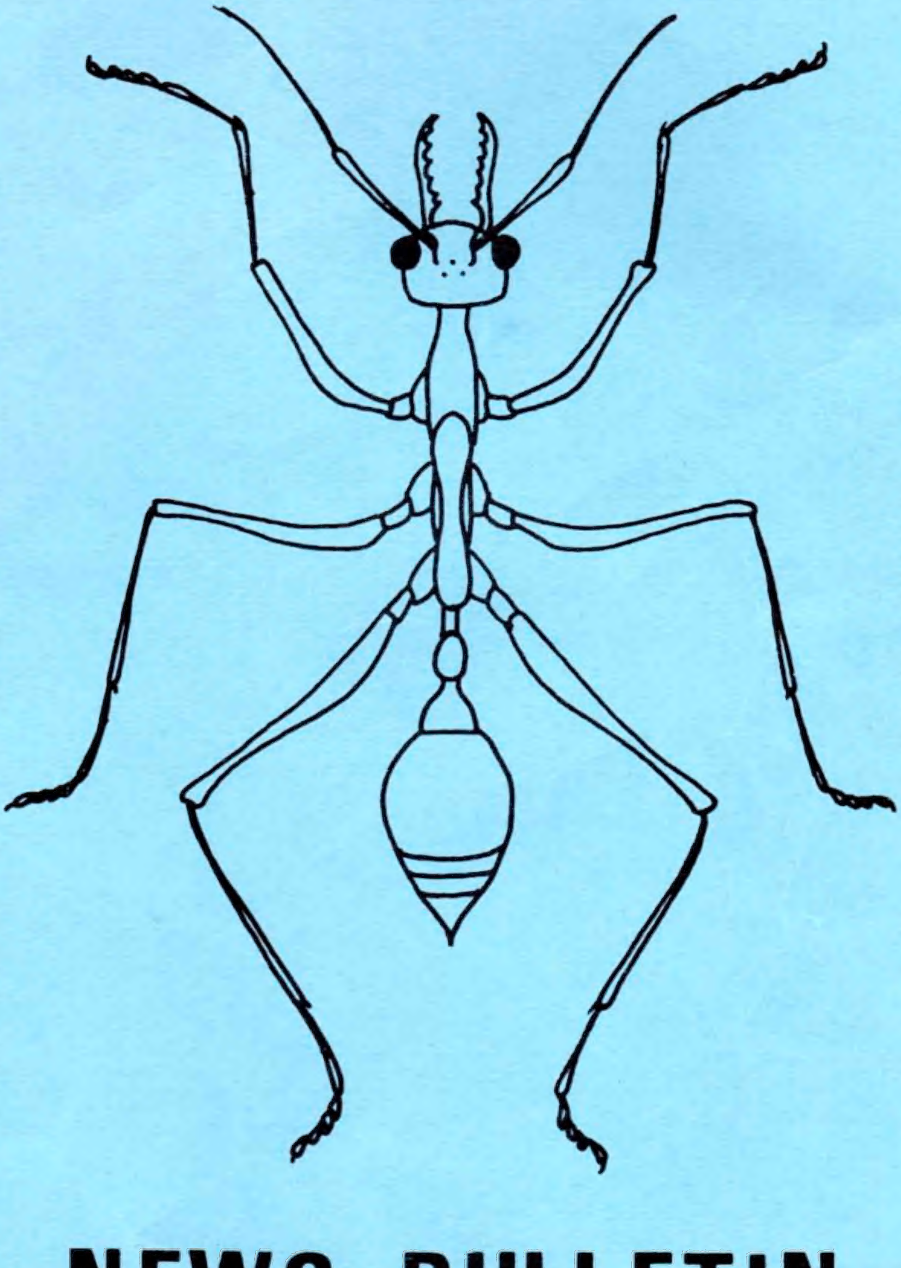
# AUSTRALIAN ENTOMOLOGICAL SOCIETY



# NEWS BULLETIN

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AUSTRALIAN ENTOMOLOGICAL SOCIETY

NEWS BULLETIN, VOLUME 5, PART 4 - NOVEMBER, 1969

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Royal Zoological Society of New South Wales: Mr. C. N. Smithers, Australian Museum, College Street, Sydney, 2000, N.S.W.

Entomological Society of Victoria: Mr. P. Kelly, 206 The Boulevarde, East Ivanhoe, 3079, Victoria.

### EXECUTIVE APPOINTMENTS

Bulletin Editor: Dr. F. J. D. McDonald, Department of Agricultural Botany, The University of Sydney, Sydney, N.S.W. 2006.

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Assistant Editor: -

Honary Auditor: Mr. J. J. Gdowski, 6 Abbott Street, Yallalumla, A.C.T. 260o.

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Articles, Notes, Letters to the Editor and other material for the News Bulletin should be sent to the News Bulletin Editor, or to your Regional Councillor.

## ALEXANDER JOHN NICHOLSON

Dr. A. J. Nicholson, one of Australia's most eminent biologists and a foundation Member of the Society, died in Canberra on October 28th at the age of seventy-four. He was born in Ireland, served in the 1914-18 War, came to Australia in 1921 as the first McCaughey Lecturer in Entomology in the University of Sydney, was appointed Assistant Chief of the Division of Entomology of the Council for Scientific and Industrial Research (now CSIRO) in 1930 and Chief in 1936, and remained in the Division as a Senior Fellow after his retirement in 1960. He continued with his personal research until a few weeks before his death.

He worked quietly and nver sought the limelight, but his influence on scientific thought and development in the country was great. He began by setting new standards of entomological teaching for Australian universities. Then, under his leadership, the Division of Entomology grew into one of the foremost entomological research institutes in the world, with a particular reputation for a wise balance between essential basic research and its application to the control of pests. His theoretical studies provided a new foundation for the exploitation and assessment of control measures, he pioneered work on the concept of integrated pest control as an alternative to indiscriminate use of pesticides, and his unswerving scientific integrity influenced every activity of the Division. Significant advances were made in the biological control of weeds and insect pests and in other methods for controlling such major pests as sheep blowfly, cattle tick and termites. During the war, the Division also did important background work to help in the control of malaria and scrub typhus and undertook special investigations to minimize the serious loss of essential stored products that resulted from the attack of insect pests.

Nicholson's own researches began as soon as he arrived in the country. His first major activity was to set about obtaining a general knowledge of the Australian insect fauna, and this he achieved with amazing speed and thoroughness. The field work that it involved led directly to his first major research, a detailed study of mimicry, for which he developed a new theory, and this in its turn provided the foundation for the experimental and theoretical studies of animal populations that occupied the rest of his life. But he never lost his enthusiasm for watching insects (and other animals) in their own habitats and for recording what he saw by the very effective photographic methods that he had developed for the purpose. He was a delightful and stimulating companion in the field, and he remained a true naturalist to the end.

He was a member of various scientific societies, an Honorary Fellow of the Royal Entomological Society of London, Honorary Fellow of the British Ecological Society, and a Foundation Fellow of the Australian Academy of Science, of which he was the first Biological Secretary. He was appointed C.B.E. in 1961.

He is survived by his wife, herself a scientist and a teacher, and two sons, Dr. Garth Nicholson of Sydney and Mr. P. J. Nicholson of Melbourne.

I. M. Mackerras

## EXECUTIVE REPORT

Three Executive meetings were held: August 26, September 26 and October 27.

### Membership:

The death of one member was recorded, and five members were elected. Membership of the society on October 27 was 375 (N.S.W. 79, Old. 79, A.C.T. 58, Vic. 57, S.A. 25, Tas. 17, T.P.N.G. 17, W.A. 15, and overseas 28). There were 47 unfinancial members.

### Journal:

Sixteen papers have been accepted for publication in Volume 8 No. 2; it is expected that a further three papers will be added and that the number will consist of 116 pages.

### Subscriptions:

Further reminders were sent in October to 45 members who have not yet paid their subscriptions for 1969, including two members who are in arrears for 1968.

The Executive was distubed to note that a number of those unfinancial are members who were elected during the current year. It has decided that, in future, new members will not be placed on the mailing list for publications until their initial subscriptions are paid.

### Executive appointments:

Dr. D. F. Waterhouse has accepted the Executive's invitation to continue as Convenor of the Environmental Quality Committee. Dr. E. N. Marks has agreed to be Convenor of the Conservation Committee, replacing Mr. J. R. French who is now overseas. Both convenors have the power to coopt members to their respective committees. Miss S. R. Curtis was appointed Assistant-Secretary. The positions of Assistant Editor and Assistant Treasurer are unfilled at present.

### Australian Biological Survey:

Following the unanimous agreement of all Councillors who replied to an Executive letter on the subject, the Vice-President has written to the Minister for Education and Science urging adoption by the Government of the recommendations of the Australian Academy of Science for an Australian Biological Survey. The text of this letter appears elsewhere in this Bulletin.

General:

The transfer of the society's headquarters from Brisbane to Canberra was accomplished smoothly, thanks to the hard work and generous cooperation of members of the previous Executive. The Treasurer visited Brisbane for several days in September for discussions with his predecessor and with the Business Manager.

## DEATHS

Mr. F. M. Angel, 293 Fullarton Road, Parkside, S.Aust. 5063.

Dr. A. J. Nicholson, Division of Entomology, CSIRO, P.O. 109, Canberra City, A.C.T. 2601 (since Executive meeting of 27.10.69).

## NEW MEMBERS

Elected 26.8.69

Dr. Judith L. Reynolds, 118 Homer Street, Earlwood, N.S.W. 2206.

Elected 27.10.69

Mr. A. D. Clift, 7 Courtenay Road, Rose Bay, N.S.W. 2029. (student member)

Mr. H. J. Elliott, Forest Research Institute, Banks Street, Yarralumla, A.C.T. 2600.

Dr. J. Nolan, c/- C.S.I.R.O. Long Pocket Laboratories, P.B. No. 3, Indooroopilly, Q'ld. 4068.

Mr. G. R. Wearne, C.S.I.R.O., Division of Entomology, P.O. Box 109, Canberra City, A.C.T. 2601.

## CHANGES OF ADDRESS

(State of previous residence is indicated in brackets)

Dr. R. E. Blackith, University Zoological Dept., Trinity College, Dublin, Ireland (U.K.)

Mrs. S. Spencer, c/- Rotorua Veterinary Club, P.O. Box 5002, Rotorua, New Zealand (N.Z.)

## NOTICES OF MEETINGS

### Victorian members - Notice of Meeting:

Victorian members are advised that a meeting will be held at Latrobe University, Zoology Department on Monday, December 1st about 2 p.m. to hear an address by Sir Vincent Wigglesworth.

Members intending to be present should contact the Victorian Councillor, Mr. P. Shelden, during the last week in November by phoning 81-1487 during office hours, for final details.

### Victorian members - Notice of Entomology Review Meeting:

A meeting is to be held on Friday, 5th December from 9 a.m. to 5 p.m. at Burnley Gardens to review topics discussed at the Applied Entomological Research Conference in November.

This meeting will summarize papers and discussions for the benefit of entomologists who were unable to attend the main Conference.

Those wishing to attend should ring the Victorian Councillor, Mr. P. Shelden, at 81-1487 in office hours, during the last week in November for final details.

## VISITORS TO AUSTRALIA

Dr. E. C. Loomis, who is in Australia on sabbatical leave working with the C.S.I.R.O., Division of Entomology's cattle tick research section in Brisbane, visited Canberra during the week ending 24th October, 1969.

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Dr. H. H. Richardson, formerly Officer in Charge of the U.S.D.A. Quarantine Treatment Research Unit at Hoboken, New York, is visiting Australia on a Fulbright Fellowship and will be associated with the Commonwealth Dept. of Health.

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Professor Howard E. Evans, Curator of Insects at the Harvard University Museum of Comparative Zoology, and Dr. Robert W. Matthews of the University of Georgia, recently began a stay of about 10 months in Australia. They are engaged in a programme of study of the comparative behaviour of sand wasps of the southern hemisphere, which will later take them to Argentina and Brazil. The wives and children of these workers will reside in Canberra, while they pursue field studies in south western Australia, New South Wales and Queensland. Professor Evans will be known to members through his books "Wasp Farm" and "The Biology of Digger Wasps", not to mention his many papers on Hymenoptera taxonomy and behaviour.

## VISITORS TO FAR NORTH QUEENSLAND

Aug.11th. Mr. Rod Parrott of Ontario, Canada called on me. He and his wife are in North Queensland for a period of about six months as part of a round the world collecting trip. They are amateur collectors.

To date his principal method of collecting has been log chopping, with very satisfactory results. Adults, pupae and larvae of a number of species of coleoptera have been obtained. The most exciting of his catch has been six adult *Phalacrognathus muelleri* Macl. I have accompanied him on several of his trips but my best effort has been P. muelleri larvae.

Aug.15th. Mrs. Jean Harslett of Amiens, S.Qld. and her son Alec called on me to see my collection. The family was on a school vacation collecting holiday to the north.

J. G. Brooks.

## ENTOMOLOGICAL SOCIETY OF QUEENSLAND

The following meetings have occurred since the last report:

### 8th September, 1969

Dr. K. Harley (C.S.I.R.O.) recently returned from a field trip in South America, "Steps towards the biological control of lantana".

### 13th October, 1969

Dr. B. F. Stone (C.S.I.R.O.) "Mechanisms of fenthion resistance in the tropical house mosquito *Culex fatigans* Wied".

The Society recently awarded book prizes to the value of $30.00 to outstanding entomological entries in the 1969 Science Contest organised by the Science Teachers" Association.

Mr. R. W. Steele, a member of the publication committee of the Entomological Society of Queensland has left Australia to work for a Ph.D. at the University of Kingston, Ontario, Canada.

## COLLECTIONS

### V. J. Robinson Collection

Mr. V. J. Robinson of Wollongong has recently donated his extensive collection of Australian Lepidoptera to the Australian National Insect Collection. Although the collection includes specimens from many parts of the Commonwealth, it is especially rich in species from New South Wales. For years Mr. Robinson lived on the Richmond River, and collected in coastal rain forest areas that have now almost entirely given way to pasture development. He has also devoted much attention to the Illawarra rain forests. Most families are well represented in the collection, but of special value are the microlepidoptera in which Mr. Robinson has specialized. The collection will remain in Mr. Robinson's keeping during his life-time and is being actively expanded; it will be stored i cabinets lent by C.S.I.R.O. for this purpose.

### Donation of Buprestidae to the A.N.I.C.(Addenda).
### A.E.S. News Bulletin Vol 5 Part 3 (Aug. 1967 page 70).

The value of this donation by Mr. E.E.Adams was lost by the omission of the designation of the species listed. The text should have read:-

| | |
|---|---|
| Curis adamsi (Deuquet) | TYPE. |
| Curis zecki (Deuquet) | TYPE. |
| Stigmodera (Castiarina) adamsi (Deuquet) | PARATYPE. |

J. G. Brooks.

## DEPARTMENTAL NEWS.

Mr. D. Morris, Senior Entomologist with the Victorian Plant Research Institute, Burnley, has returned from a three months world tour in which he studied recent developments in deciduous fruit pest control with special reference to integrated control programmes. The visit included discussions on culture techniques and the use of pathogens against Codlin moth.

# ABSTRACTS OF THE SYMPOSIUM "WHITHER TAXONOMY" HELD AT VICTOR HARBOUR S.A. ON 17TH AUGUST, 1969.

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## The Present Status of Australian Insect Taxonomy - K.H.L.Key, Division of Entomology, C.S.I.R.O.

The main task of insect taxonomy in Australia is the comprehensive documentation of the Australian fauna. It seems probable that something like 15,000 species of Australian insects still await discovery, or about 30% of the total. Thus even at the lowest level of taxonomic knowledge - the naming and describing of the species - an enormous amount remains to be done. It is probably still true that the insects of Australia are the least known of any major land mass, except perhaps South America. Even less is known about the distribution of our species. One is all too often unable to answer with any certainty the question whether two closely related putative species are sympatric or not, in spite of the fact that this is a most important datum for assessing reproductive isolation, and hence the status of the forms concerned as species or infraspecific taxa.

The quality of the taxonomic work done is very variable. Overseas workers are at a marked disadvantage, since they cannot obtain additional material from critical areas, much less living material. The new approaches and techniques of taxonomy have not been very widely applied in Australia, but it is questionable how far this would be desirable, in view of the magnitude of the task still remaining at the alpha level. However, some interesting work has been done along these lines, e.g. by Martin and by White and his associates. There are also a few notable Australian contributions to taxonomic theory, mainly by Colless. Apart from overt applications of the new approaches, they have had a subtle and fairly widespread influence on the collection and evaluation of taxonomic data and on the modes of inference from them.

The Australian insect collections, comprising mainly those of the State museums and the Australian National Insect Collection, provide good material for taxonomic research - much better than overseas collections - but they need adding to from many critical areas. An appropriate collecting strategy needs to be worked out, with emphasis on systematic surveys, especially of areas in which natural habitats are being reduced to a few small refuges. Every effort should be made to prevent any further alienation of holotypes. In fact, it could well be considered that we have an obligation to let it be known that visitors to Australia who intend to collect insects will be welcome only if they agree that any holotypes designated from the material they obtain will be deposited in an Australian institution.

Personnel and funds allocated to taxonomy in Australia are quite inadequate for the task before us. Facilities for publication are good. More publicity is needed on the aims, needs, and uses of taxonomy. The activities of our Society, the forthcoming book on "The Insects of Australia", and the 1972 International Congress of Entomology will all contribute to this.

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## New Trends and Future Prospects: II The Phenetic Approach and Numerical Taxonomy -

Donald H. Colless, Division of Entomology, C.S.I.R.O.

Phenetic taxonomy is the classification of things according to their relative degrees of "overall similarity", estimated from a large sample of characters (Colless, 1967a, 1967b). It is by no means "new", but an ancient and basic activity, well exemplified in everyday language; but it has only recently emerged as a set of definite techniques, which we call "numerical taxonomy" (Sokal and Sneath, 1963). The unavoidable "fuzziness" of such classifications makes for flexibility and comprehensiveness, but clashes with the feeling that they should be in some sense "true", not just useful. Much opposition springs from that source.

The capacity and speed of the electronic computer enables it to process phenetic classifications much more precisely than is possible using intuitive methods. But the results can be no better than the instructions we give the computer, and we alone can provide the data. So, we must first determine the purpose of our classifications, and how our principles can best be expressed in simple, mathematical operations. It emerges that there can be no objectively unique phenetic classification - only one chosen from many.

In making that choice, we may try to maximize the information content of our classification, i.e. optimize its usefulness; or we may seek a reflection of evolutionary history, i.e. a "phylogenetic" classification. Those aims are not in conflict, since the information stored relates to characters that are variable, as a result of evolution. It is therefore 'phylogenetic" information, and a phenetic classification provides a "phylogenetic" hypothesis, to be tested against further characters and taxa.

Numerical taxonomy typically proceeds through 4 successive stages:

1. Description of organisms in terms of "unit attributes", single items of information, judged to be "operationally homologous" in the light of theories of morphology, physiology, genetics, etc. Here we draw upon all available biological information.
2. Estimation of "coefficients of resemblance" between all pairs of organisms, using equally weighted characters and concepts of either (a) matching, (b) correlation, (c) spatial distance, or (d) information content.
3. Generation of a hierarchy by an appropriate "clustering" technique, which successively forms classes-within-classes, within which organisms resemble each other less and less.
4. Simplification of the hierarchy into a conventional, working classification.

These operations are by no means mechanical or "unscientific" - stage 1. alone calls on an immense body of theory. They are time-consuming and perhaps they will never become routine practice; but, wisely used, they can reveal taxonomic structure not otherwise discernible. The "phylogeneticists" opposition is misguided, since "phylogenies" are but hypotheses for testing; and the prime candidates for test are those generated by phenetic methods.

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## NEW TRENDS AND FUTURE PROSPECTS I. NON-MORPHOLOGICAL TECHNIQUES -

Jon Martin, Department of Genetics, University of Melbourne.

The description of many species of insects, based on classical morphological characters of pinned specimens, have proved inadequate when populations are studies with regard to ecology, behaviour, biochemistry or cytology. All too frequently the supposed taxonomic entity then turns out to be a complex of two or more closely related species. This is usually not due to any basic shortcoming in the use of morphological characters since very frequently species distinctions, once recognised by non-morphological techniques, can subsequently also be found in morphological characters.

Consequently, any worker who ignores these aspects in future taxonomic work on groups where this problem is likely to occur, is liable to have his work considered as incomplete.

Australian taxonomists are hampered by their small numbers and are faced with the task of obtaining as much information as possible about the species inhabiting those parts of the continent where development is rapidly eliminating the natural environments. In this predicament they must strike a balance between the more rapid, museum-type collecting for classical taxonomy and a full application of non-morphological techniques to each group studied. This balance may be struck by a careful choice of the groups on which the newer techniques will be applied, since no one of these techniques is as yet a complete answer to taxonomic problems in all groups. Field workers may assist in providing material for such studies by the preservation of material in a manner suitable for subsequent non-morphological analysis.

In the past, species have rarely been chosen for study by non-morphological techniques because of their particular suitability. Usually a worker more interested in some general biological phenomenon, has noted the deficiency in taxonomy and takes just sufficient time from his main interest so that he may establish exactly with which species he is dealing.

This trend seems likely to continue unless the attitude of most universities and grant giving bodies becomes more favourable to purely taxonomic projects.

## TAXONOMY AND THE STUDY OF EVOLUTION -

I.W.B. Thorton, Department of Zoology, La Trobe University.

The rise of numerical taxonomy, with its clearly enunciated aims, its objective, purely phenetic approach, and its operational precision, has resulted in a re-appraisal of methods by "phylogenetic" or "evolutionary" taxonomists. In recent years, several workers have developed a school of phylogenetic taxometry, which attempts to combine the precision, objectivity and clear, repeatable methodology of the pheneticists with the use of known evolutionary principles. The aim of this school is the best estimate of the unknown phylogeny of the animals under study, and the methods do not and cannot in any way rest on a knowledge of that phylogeny.

Hennig's method is cladistic (i.e. taxa are related to each other strictly according to their presumed nearest common branching points) and requires the assumptions of equal rates of evolution in all lineages, and that monophyletic groups, comprising the total descendants of one ancestral stock, are recognisable by the common possession of relatively derived (synapomorphic) character states. Camin and Sokal have devised a statistical cladistic method using large numbers of characters and incorporating the principle of evolutionary parsimony.

Assumptions in this method are that ancestral character states are unique, derived states are unreversed, and that a particular direction of evolution for each character can be assumed. Edwards and Cavalli-Sforza's mathematically sophisticated method involves the assumptions that branching is random, probability of branching is constant, and rate of change is constant. The 'random-walk' principle is applied, and the phylogeny which is most likely to have resulted in the existing groups is estimated.

Throckmorton's approach attempts to combine elements of both the phenetic and cladistic approaches, and the aim is the detection of genetic continuity through the history of genotypes as estimated from the distribution of phenetic characteristics over the groups under study. Phenetic taxometry is used for the detection of "primary groups", and these are then analysed for the distribution over them of distinct character states, in order to infer the genotypes potential in their stem populations. The assumption is made (which is least limiting) that always the population antecedent to the one in question is heterozygous. New clusters are successively produced by using sets of derivative character states (obtained by the deletion of states occurring both inside and outside the group under study) and "probabilities" are assigned to lineages according to the number of states which define them. Throckmorton has demonstrated that character states have different values when judged by their purely phenetic properties.

Kluge and Farris have recently proposed a method of weighting characters according to their within -O.T.U. variation, which is taken as being inversely related to their evolutionary conservatism.

It is suggested that with newly-discovered complexes about which little is known, such as those found on oceanic archipelagos, phenetic methods will prove indispensable and may be the only operational approach. Where groups are better known, methods of phylogenetic taxometry should be tested. The goal of taxonomists, as students of evolution, should be an eventual synthesis of phenetic method with the avowed evolutionary process and estimating the paths of descent. Throckmorton's approach gives hope that this combination need not be a discordant one.

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## PROPOSED BIOLOGICAL SURVEY OF AUSTRALIA

The following is the text of a letter sent by the Vice-President to the Minister for Education and Science, Mr. J.M. Fraser:

"My Society has recently discussed the document entitled "Proposal to Establish a Biological Survey of Australia" submitted to you by the Australian Academy of Science, and published by the Academy in October 1968 and, in The Australian Journal of Science, in May 1969. Members of the Society are deeply impressed by the value of this proposal, and wish me to express to you their whole-hearted support for it and their hope that it may be implemented as a matter of great urgency. The Society has a membership which includes virtually all Australian professional entomologists engaged in research and teaching, and produces a series of scientific publications including a Journal of recognised international standing.

Our interest in this matter arises in part from the fact that three-quarters of all the species of living organisms are insects. We estimate that some 30 per cent of the species composing the vast Australian fauna remain quite unknown, and await collection, naming and study. For only a very small percentage do we have any worthwhile information on geographic range or potential economic significance. The overwhelming majority of Australian insects are unique to this continent, and some are highly aberrant creatures comparable with the marsupials amongst mammals. Yet these insects are being progressively restricted in range (in some species even to the point of extinction) by the same changes in the natural environment that endanger the survival of so many species of mammals and birds. It is worth noting that many Australian insects are beneficial components of agricultural systems, and that they and other indigenous species have provided the subjects of research for which this country has a substantial and rapidly growing world reputation.

The proposed biological survey would provide information of great value in meeting any threat from potential insect pests to the economic development of new areas. In northern Australia, for example, native insect species caused disastrous losses in cotton and other crops before they were identified and appropriate control measures devised. In addition, the survey would provide a source of background information leading to a vastly improved understanding of many well established pest situations.

Quite apart from the utilitarian benefits which would flow from it, the survey would be of great intrinsic scientific and educational value. Advancement of knowledge of the unique

Australian fauna is regarded by world biological science as an Australian responsibility and obligation. Unlike research in the physical sciences and in many other fields of biological science, this can only be pursued in Australia, and the scale of the problem is such that it can only be done with government support.

We believe that your Government clearly recognizes the urgency of research on elements of the Australian fauna under threat of extinction, and the justification for governmental support for such undertakins. I refer, in particular, to your welcome decision to establish an Institute of Marine Biology in northern Queensland. It is the considered opinion of my Society that the land fauna of Australia is no less endangered than that of the Great Barrier Reef, the seriousness of which is now so widely appreciated."

## PERSONAL NOTES

Mr. Ray Straatman writes: "I am at present 'free-lancing' after working for 6 years for the Bishop Museum at Wau, T.P.N.G., and travelling as a collector through many parts of the South Pacific region. I am at present at Sogeri, a locality some 30 miles from Port Moresby. I will be glad to meet any member of the Society when visiting the Territory, and to offer my services as a guide to various localities known as the biotopes of some of the more important insects, which are often rather localised."

Fr. B. Lowery, who moved from Sydney to Adelaide early this year, will spend the month of December in the Esperance area of W.A. where he plans to collect ants, including the elusive (legendary?) Nothomyrmecia macrops Clark.

Ted Kearney (E.G. Kearney) of St. Patrick's College, Manly, N.S.W. and of Campbelltown, Sydney and a member of the Aust. Ent. Soc. was ordained to the priesthood on August 24, 1969.

We extend to him our congratulations on reaching this goal of his ambitions.

Fr. Kearney is specially interested in ant taxonomy and behaviour and has built up a fine collection of ants from Sydney areas and from the rain forests of Northern N.S.W.

## DISCOVERY OF A BLIND GROUND BEETLE IN A TASMANIAN CAVE

The recent and exciting discovery of a completely eyeless cave beetle in Tasmania removes a puzzling anomaly from southern biospeleology. This beetle, a new species of the Carabidae, subfamily Trechinae, was first found last autumn by Mrs. Mary Mendum at the far end of Exit Cave, Ida Bay, and it occurred some two miles in from the only accessible entrance. It has subsequently been collected by other cavers. In its degree of specialization, it is way ahead of any other known Australian cave beetle and it appears to be fully comparable with New Zealand species of the genus Duvaliomimus and with the well-known troglobitic trechines of the northern hemisphere. This brings our cave fauna into line with those of the other major regions.

The new species (and the new genus it requires) will be described in the writer's forthcoming revision of the Australian Trechinae.

B.P. MOORE

## A.N.Z.A.A.S. 42nd CONGRESS

### PORT MORESBY, PAPUA-NEW GUINEA, 17th -21st AUGUST, 1970.

### SECTION 11 : ZOOLOGY

Two sessions will be of special interest to entomologists. These are:

a symposium on "Polymorphism and Speciation" and

a sesson on - "Tropical entomology".

Offers of papers for these sessions are now requested. Papers should be 15-20 minutes in length and a summary should be submitted in advance.

Members are reminded that owing to shortage of accommodation, membership of the ANZAAS Conference will be restricted to 1000, so early enrolment is essential.

K. P. LAMB
Chairman, Section 11.

# OCCASIONAL PUBLICATIONS
# OF THE AUSTRALIAN ENTOMOLOGICAL SOCIETY

## HANDBOOK NO. 1

Methods of Collection and Preservation of Insects

By K. R. Norris, Division of Entomology, C.S.I.R.O.

This Handbook is indispensable for all, whether amateur, professional or student, who collect insects.

40 pp. Price: A$1.00

## MISCELLANEOUS PUBLICATION NO. 1

The Entomology of Citrus in New South Wales

(W.W. Froggatt Memorial Lecture)

By P. C. Hely, Department of Agriculture, N.S.W.

20 pp. **Price:** A$1.00